

# **Crop Disease and Management Practices**

**Plant Pathology-II**

# Stem rot of Rice

**Causal Organism** : *Sclerotium oryzae*.

## Distribution

The disease has been reported from all rice growing countries such as Japan, China, Philippines, Sri-lanka, Brazil, Italy etc. Sclerotial stage of stem rot rice was first described by Cattaneo from Italy in 1876. In India the disease was first reported by Bengal, 1911.

## Symptoms

The disease commonly found in transplanted rice in the month of July - September.

1. First of all, small dark lesions are developed outer leaf sheath at the water line. Later on this lesion gradually make their appearance on the inner leaf sheath and the culm.
2. The affected and numerous small dark brown Sclerotia are formed in the tissues of the leaf sheath. In later stage, the mycelial mats and the Sclerotia are copiously formed in side the culm also.
3. Rotting remains restricted to a few lower inter-nodes. As the plants matured the intensity of infection is increased.
4. The culms collapse and plants lodge heavily, when the infection attacks place later in the growing season, the grains are much shrivelled.

## Nature and Recurrence of disease

The Sclerotia float on water and spread from fields to fields or plants to plant. The Sclerotia are responsible for primary infection. Where as, when the conidia are produced, they are also spread through the irrigation water and secondary infection may caused.

## Favourable condition

- Excessive flooding.
- Excess use of nitrogenous fertilizer.
- Early and late varieties.
- Excess use of phosphatic fertilizer.

## Control Measure

- The best method of disease control is to cultivate resistance varieties.
- Wide spacing should be provide.
- Crop rotation and field cultivation should be practiced.
- Proper manuring and balanced fertilizer.
- Spraying with **Cupravit @ 0.4%** and **Topsin @ 0.2%** when disease appear.

## Bacterial Leaf Blight of Rice (BLB)

The most common bacterial leaf blight of rice caused by *Xanthomonas oryzae*.

BLB probably world wide in distribution.

### Symptoms

1. The symptoms appear on leaf blade and sheath as small linear, water soaked areas that soon elongate and coalesce into irregular, narrow, yellowish or brownish stripes.
2. Severe infection causes leaves to turn yellow and die from the tip downwards; it also retards spike elongation and causes blighting.
3. Small lesions form on the spike as well. The disease develops mainly in rainy, damp weather. The bacteria overwinter on the seed and crop residues and are spread by rain, direct contact and insect.

### Control Measure

- The main control measures are use of disease free or treated and crop rotation.
- Seed treatment with **agrimycin @ 0.025%** for 12 hours before sowing.
- In infected field spray with **Potassic fertilizer @ 50-100 g/L** water at evening.
- Avoiding susceptible variety for cultivation.
- Crop residues should be burnt after harvesting.

## Tungro Disease of Rice

### Tungro virus

Tungro is the most serious viral disease of rice in south and south east Asia from Pakistan to the Philippines.

### Virus and Vector

Tungro is the result of concurrent infection by two viruses, the single stranded RNA virus/Rice Tungro Spherical Waika Virus (RTSV) and the Double stranded RNA virus, Rice Tungro Bacilliform Badnavirus (RTBV). Both viruses are transmitted by several leaf hoppers, particularly *Nephotettix virescens* (GLH) in the semi-persistent manner.

### Symptoms

- Tungro infected rice plants are stunted and show mottling and yellow orange discoloration of the leaves.
- The typical tungro symptoms can be caused by RTBV, but they are intensified by the presence of RTSV.
- RTSV often occurs alone but causes only very mild symptoms. The disease caused by RTSV alone was earlier known as rice waika and the virus was rice waika virus.

- Infection generally starts from seedlings stage. Green leaf hoppers are seen in the field, infected plant roots are weak and pulled up the plant by hand easily comes out.

### Control Measures

Control of tungro disease depends on the use of vector resistant or virus resistance varieties. Tungro disease is usually endemic in Irrigated areas, where are rice planted round the year.

- **Cultural Practices-** Planting time, crop density sanitation and roughing, fertilizer management, seed protection, crop rotation, synchronous planting and crop free period.
- **Chemical Control-** Insecticides for the control of spraying GLH e.g. **Diazinon 57 EC @ 15 ml/L** at 7-10 days intervals for 2-3 times to protect the vectors.
- **Use of resistant varieties-** BR 10,11,14,16,20,22 & BRRI dhan 27,36,39,41 etc.
- **Destruction of alternate hosts-** Durba, syama, arial.

## Blast Disease of Rice

**Scientific name:** *Pyricularia grisea*, *Magnaporthe grisea*.

**Causal organism:** Fungus.

### Occurrence

Blast disease of rice is a world wide and most important disease of rice. Particularly, It occurs in areas with low soil moisture, frequent and prolonged periods of rain shower, and cool temperature in the daytime. In upland rice, large day-night temperature differences that cause dew formation on leaves and over all cooler temperatures favor the development of the disease. Rice can have blast in all growth stages. However, leaf blast incidence tends to lesion as plants mature and develop adult plant resistance to the disease.

### Symptoms

**Leaf Symptoms:** Lesions that occur on the leaf are usually diamond-shaped with a gray or white in center and brown or reddish brown border Or Leaf blast lesions are usually elongated and pointed at each end, while brown spot lesions tend to be more round, brown in colour and have a yellow halo surrounding the lesion. Newly formed lesions may have a white or grey-green center and a darker green border. Leaf blast may sometimes cause the complete death of young plants up to the tillering stage. Leaves of susceptible varieties may be killed.

**Leaf Collar Symptoms:** Infection at the junction of the leaf blade and sheath results in the typical brown "collar rot" symptom. A severe collar infection may cause the leaf to die completely.

**Node Symptoms:** Stem nodes may be attacked as the plant approaches maturity, causing the complete death of the stem above the infection. Diseased nodes are brown or black.

**Panicle and Grain Symptoms:** Lesions may also occur on panicle neck. Infections just below the panicle, usually at the neck node, cause a "neck rot" or "rotten neck blast" symptom that can be very injurious to the crop. If neck rot occurs early, the entire panicle may die prematurely, leaving it white and completely blank.

Later infections may cause incomplete grain filling and poor milling quality. Other parts of the panicle including panicle branches and glumes may also be infected. Panicle lesions are usually brown, but sometimes the infected necks turn blackish and break over. Neck blast results in few or no seeds in the panicle.

### **Recurrence of the pathogen:**

The pathogen over season at mycelium and conidia on disease rice straw and seed. The matured conidia become air borne and landing on rice plant. The conidia adhere through sticky mucilage.

### **Conditions that favour development**

- i) Infested or diseased seeds.
- ii) Excessive use of nitrogen.
- iii) Poor air flow and poor sunlight penetration.
- iv) Rainy days with high humidity.

### **Prevention and control**

- i) Use diseased- free seeds and early planting.
- ii) Use resistant cultivars.
- iii) Proper plant spacing, transplanting is advisable rather than broadcasting.
- iv) Split applications of nitrogenous fertilizer.
- v) Apply compost.
- vi) Avoid farm activities when plants are wet.
- vii) Burn diseased- straw and stubble.
- viii) Malabar nut extract.
- ix) Systemic fungicides like **triazoles and strobilurins** can be used judiciously for control of blast. A fungicide application at heading can be effective in controlling the disease.

## **Foot rot of Rice/ Bakanae disease**

**Causal Organism :** *Fusarium moniliforme*.

### **Distribution**

The foot rot of rice was first recorded from Italy in 1877. From Japan, the disease was first described in 1898 and was known as Bakanae disease. The pathogen is world wide distribution.

### **Symptoms**

1. The disease affects the host mainly in the seedlings stage and symptoms are clearly seen in the nursery. Sometimes grains fail to germinate or the seedlings fail to emerge above the soil.

2. The most conspicuous and detectable symptoms of the diseases appear in the seedlings. The affected seedlings become thin, pale and tall, such symptoms appear from the 6<sup>th</sup> days after sowing in wet nurseries and continue upto 6 weeks.
3. As soon as the symptoms appear the seedlings wilt and die within 3-6 days.
4. Mainly this is a nursery disease but may occur throughout the life of the crops. In severe infection either the panicle doesn't develop or a whitish sterile ear is develop.

### **Natural Recurrence of Disease**

Generally the disease is externally seed borne, there are evidence to show them the disease may sometimes soil borne. The infected stubbles and plant debris may left in the field after harvest cause infection through the soil.

### **Favourable Condition**

1. Soil temperature and moisture influence the intensity of the disease.
2. Optimum temperature for the survival of pathogen lies between 25-30<sup>0</sup> C.
3. Excess use of nitrogenous fertilizer increase intensity of disease.

### **Control Measures**

- Since the disease is seed soil borne, various methods of seed/ soil treatment have been suggested for the control of this disease.
- Grain/ seed are steeped in **1% formaline for 15 minutes**.

## **Black/ Stem rust/ Rust of wheat**

**Causal organism :** *Puccinia graminis tritici*.

### **Symptoms**

1. Black rust is first marked by an eruption of elongated brown pustules on the stalk, leaf sheath and leaves. This pustules may be quarter of an inch or more in length and frequently run into one another.
2. Later on teliosorus developed. The teliospores are often produced in the same sorus as the uridinospores and they are darker in colour.
3. One can see the pustules gradually changing from brown to black as the season advances.

### **Recurrence of the Pathogen**

The pathogen are ear borne. The pathogen pass their life cycle on two different host wheat and barberry, which are abundantly found in hilly region. The summer heat in the plains that follows the wheat harvest kills on the uredinospores of rust.

### **Control Measures**

1. Through yield cultivation, proper manuring and balanced fertilizer.

2. Seed treatment **vitavax 200 @ 3 gm/ kg** or **Bavistin @ 2 gm/ kg** seed.
3. Spraying with **Tilt 250 EC @ 1 ml/ L** of water or **calyxin @ 0.5 ml/ L** of water.
4. Cultivate resistant varieties.

## Powdery Mildew of Wheat

**Causal Organism:** *Erysiphe graminis*.

### Distribution

The powdery mildew of wheat is commonly found in those region where, there is enough moisture during sowing time. This disease has not or little importance in the plains of India and Bangladesh. This disease is commonly found in the lower hill tracts of Northern India.

### Symptoms

The pathogen is an obligate parasites and usually found on leaves, young shoot, inflorescence and other tissues of host plant.

1. The fungus may appear in an isolated white patch in the beginning, which may coalesce with other patch and form big one's on the leaves. Sometimes hole of the leaves is found to the affected.
2. The mycelium on the host is entirely superficial, forming a flocculent matted growth. At first white when the conidia being formed, there after changing into a grey or Reddish brown in colour when cleistothecia are developed.
3. In severe cases, the leaves become crinkled, twisted or variously formed. The top of the shoots drops down and wither and ear developed is checked to some extend.
4. Later on, usually at earing time small dot like, spherical cleistothecia are formed in the superficial mycelia.
5. From much discolouration and coverage of host epidermis by fungus, photosynthesis is less and there is much chlorosis which makes the plant weak.
6. The development of infected ear is arrested and the ear wither. If the disease incident takes place at the milk stage, the grain are dried and shrivelled.

### Natural Recurrence of Disease

The recurrence of disease takes place cleistothecia. The cleistothecia remain on the straw and plant debris. After harvest and provide the necessary inoculum for the next season. The primary infection is brought by ascospore and the secondary infection is formed by air borne conidia.

### Control Measures

- The best method of control is to sow the resistant varieties in foreign countries like USA, Canada much work has been done to evolved the resistant varieties.

- **Sulphur dusting @ 2-3 kg/ ha** at 2-3 times in 12 days intervals has been proved to be fruitful in the control of this disease.
- Spraying with **calyxin @ 0.4 L/ ha**.

## Loose Smut of Wheat

### Occurrence

Loose smut is a serious disease of wheat and is responsible for heavy losses, when susceptible varieties with infected seeds are grown year after year. It occurs world wide but more abundant and serious in humid and sub-humid regions. Loose smut causes damage by destroying the kernels of the infected plant and by smearing and thus reducing the quality of the grain of the infected plants on harvest. Losses from it may be up to 10-40% in certain localities in a year.

### Symptoms

1. The destructive nature of the disease lies in the fact that every head of the affected plants may be converted into a black mass of spores and number of grains are formed.
2. In an infected plant, usually all the heads and all the spikelets and kernels of each head are smutted, that is they are each transformed into a smut mass containing of olive green spores.
3. Smutted kernels are at first covered by a delicate greyish membrane which soon burst and sets the powdery spores free. The spores are then blown off by the wind and leave the rachis a naked stalk.

### Pathogen and development of Disease

**Causal organism :** *Ustilago nuda*.

- The mycelium is hyaline during its growth through the plant and it is hyaline changing to brown near maturity. The mycelial cells are transformed into brown, spherical, teliospore which germinate readily and produce a basidium consisting of 1- 4 cells.
- The pathogen over winters as dormant mycelium in the cotyledon of infected kernels when planted infected kernels begin to germinate and the mycelium resumes its activity and grows intercellularly through the tissues of the young seedlings until it reaches the growing point of the plant.
- When the plant forms the head, the mycelium invades all the young spikelets, where it grows intercellularly and destroys most of the tissues of the spikelets.
- The mycelium in the infected kernels soon transformed into teliospore, which are contained by a delicate membrane, after maturation the membrane bursts and the teliospore is blown off by air current and spread to the healthy plant.

### Control Measures

- Loose smut is now controlled by treating infected seeds with **carboxin and its carboxanilide** derivatives before sowing.
- Use resistant varieties.



- The best means of controlling loose smut is through the use of certified smut free seed.
- Treating seed with hot water, half filled barlap bag.
  1. 20<sup>0</sup> C water for 5 hours.
  2. After 1 minute 49<sup>0</sup> C for 1 minute.
  3. Then in 52<sup>0</sup> C water for exactly 11 minutes and immediately placing it cold water for the seeds cool off.

## Covered Smut of Barley

**Pathogen:** *Ustilago hordei*.

### Distribution

The covered smut of barley is world wide in its distribution. It is found all those countries where the barley is grown. It is common disease of barley in northern India.

### Symptoms

1. As soon as the ears of infected plants emerge out, the first symptoms easily may be seen. The smutted or blackened ears come out of the leaf sheath, which may easily be recognized from the long distance.
2. All the ears of diseased plant become infected and all the developing grain turns into smut sorus remains covered by a white shining, silvery membrane which is partially developed from host tissue and partially from fungus.
3. Due to this compact covering, the smut spores are not blown off, and thus the disease is named "covered smut".

### Nature and Recurrence of Disease

This is an externally seed borne and systematic disease. Every year the recurrence of disease takes place by the contaminated seeds. The mycelium develops from the very beginning. Along with the coleoptile and ultimately reaches the ear. During threshing the smut sori break and smut spores are released and they make the seeds contaminated again.

### Control Measures

- The infected plant may be uprooted and burnt.
- Seed must be taken from healthy crop.
- The infected seed may be treated with **organomercuric** compounds such as **agrosan G.N.** About 5 kg of seeds may be treated with 10 gm of seed disinfectant for about 15 minutes.
- The resistant varieties should be grown. Some resistant varieties are K12, CN294, C84 etc.

# Leaf Blight of Maize

**Pathogen:** *Helminthosporium turcicum*.

## Distribution

The disease is a quite common in many parts of India. It was first described in Italy in 1876 and since then has been recorded from the USA, South Africa, Japan and the Philippines and most maize growing countries.

## Symptoms

1. The symptoms appear as small, yellowish, round or oval spots on the leaves. These extends along the leaf and coalesce into longitudinal bands, which may cover a great part of the leaf.
2. The affected tissue gradually become dark in coloured and are being covered in moist weather with velvety dark green patches due to the fructification of the fungus.
3. Ultimately leaves are dried up and have a blighted appearance. The plants remain stunted and the ears poorly developed.

## Recurrence of Disease

The disease survives on plant debris in the soil.

## Control Measures

- The leaf blight on maize effectively be controlled by spraying either **Captan or Zineb**.
- Sanitation and crop rotation should be practiced.

# Smut of Maize

**Pathogen:** *Ustilago maydis*.

## Distribution

The disease occurs in most countries where maize is cultivated. This disease occurs many parts of Europe, USA, Eurasia, India and Australia. The climatic condition which favours the disease is the damp warm weather during the period of most vigorous growth of the crop.

## Symptoms

1. The disease appear in the form of soft tumours or galls appear on cobs, tassel's buds, Stalks and least often on the leaves and roots.
2. Usually the first galls are seen on the leaves when the plant is more than a foot high. The galls are generally small and wrinkled, at first white, then dark form the development of spores in their interior.
3. As the plant grows more galls appear, especially at the junction of the leaf sheath and leaf blade and at the nodes of the stem.

4. On the appearance of the tassels, small galls appear on the male flowers. The cob is very frequently attacked.
5. The whole ear or more often only individual flowers are affected and the large galls are formed. Sometimes the large spathes enclosing the cob are affected by large galls.
6. Even when a few flower of the cob are attacked, the amount of grains produced may be greatly reduced, as the grains near the smut galls frequently do not developed.

### **Control Measures**

- Crop rotation and field sanitation might be expected to offer some control.
- To grow smut resistant varieties is the most effective method of control.
- Several smut resistant hybrid varieties have been evolved and distribution among farmers.

## **Leaf Spot Disease of Cotton**

**Pathogen :** *Cercospora gossypina*.

### **Distribution**

The disease is found in many countries of the world such as USA, West indies, Egypt, China and other cotton growing countries. In India this disease is found Sporadically in cotton growing states.

### **Symptoms**

1. The disease may appear, at any stage in the growth of the plant, but chiefly when plants are fully grown. The rounded or irregular spots appear on both surface of the leaf.
2. The spots are generally 4 mm in diameter. They are first yellowish-brown. Then whitish in center from the withering of the tissues.
3. The margin of spots consists of a distinct dark brown or a blackish rim which in young spots, may be reddish in beginning.
4. The adjacent Coalesce with each other forming large patches of the leaf to whiter. In old spots, the center cracks or breaks forming a hole. Badly infected leaves lose their green colour turn yellow and ultimately wither and drop it.

### **Nature and Recurrence**

This is soil borne disease. The mycelium and conidia survive in the soil and infect the plants in the coming season.

### **Control Measures**

- The exotic varieties of cotton are immune to disease.
- Since the disease is soil borne, all plants debris should be collected and destroyed by burning it.

# Angular Leaf Spot of Cotton

**Pathogen:** *Xanthomonas malvacearum*.

## Distribution

The disease occurs in all cotton growing countries of the world. The disease is responsible for heavy losses and has been supposed to be third major disease of cotton. It was first recorded in the USA (Smith, 1920) where this was known as angular leaf spot.

## Symptoms

1. On the leaves spot appear angular in shape, as the primary infection are limited by small veins. The spots are dark brown in colour and they may coalesce to form large blotches on newly formed leaves.
2. The attack is limited to the tissue on either side of the veins. In wet weather, the narrow dark brown areas extend up to petioles. However, in dry weather condition the severely attacked leaves fall off and the plants remain barren.
3. Elongated and discoloured areas appear on the young shoots and older branches. The stem infection are sunken and turn black from which symptoms the name "blackarm" has been derived. Such symptoms may extend many inches in length.
4. The bolls may be attacked at all stages of development. The young bolls may be killed and fall off whereas the older bolls bear large dark spots which turn black. The seed also becomes contaminated and the lint is often destroyed or rendered useless.

## Nature and Recurrence

This is a seed borne disease. The primary infection takes place through seed borne bacteria. The bacteria form slimy masses round the hairs surrounding the micropyle of the seed. On germination of contaminated seed, the bacteria infect the cotyledon as they emerge through soil and produce elongated marginal lesions. Thereafter, the leaves and stems are being infected.

## Control Measures

- Since the disease is borne, the seeds should be treated with **organomercuric** prior to sowing. To seeds may be soaked overnight in 1000 ppm of **streptomycin sulphate**.
- Since the bacteria can survive for few weeks in plant debris, the affected portions should be collected and destroyed.
- The resistant varieties should be evolved.

## Stem Rot of Jute

**Pathogen:** *Macrophomina phaseoli*.

### Distribution

This is destructive disease of crop in Assam, West Bengal, Bihar, Orissa. It has also been reported from other jute growing countries (e.g. Bangladesh) of the world.

### Symptoms

1. At first the seedlings are being attacked and the earliest symptoms appear on the hypocotyls and cotyledons in the form of brownish black streaks.
2. When the plants become old, the shedding of leaves take place and ultimately the plants are succumbed to death.
3. The necrotic lesion appear at the apex and along the margin of the leaves and soon after the complete leaf blade, midribs and petioles are affected. The lesion also appear on the stem in the form of blackish brown depression.
4. Several such lesion on the stem coalesce and most of the parts of the stem is being covered them. Often lesion spread along the stem and ultimately the cortex become shedded exposing the fibre.
5. Root is rarely infected.

### Nature and Recurrence

This is a soil as well as seed borne disease. The primary inoculum is received from infected seed and soil in the form of pycnidia and sclerotia.

### Control Measures

- Clean seed should be sown. The seed should be obtained from those areas where the disease was not present.
- Resistant varieties should be sown.

## Blight of Gram

**Pathogen:** *Ascochyta rabiei*.

### Distribution

The disease was first reported from India in 1911 by Butler. Now this is world wide in distribution. Much damage is being done in Europe and Canada.

### Symptoms

1. All the green parts of the plants of the plants attacked. Dark lesion appear on the stem and leaves first, then on the pods.

2. On the stem, the lesion are oval or elongated. Whereas on the leaves and pods, round upto 1.25 cm in diameter. When the lesion are fully developed the margin is brown and the centre yellowish.
3. Withered and stunted with the minute, dark fructification of the fungus. Often concentrically arranged.
4. When the spot girdle the stem, the entire plants wither and ultimately die. As the attack of the disease begins from the base of the plants, which results in the death of the whole plants.

### **Nature and Recurrence**

The disease is both externally and internally seed borne. The fungus survive in the seed in the form of mycelium as well as pycnidia. The secondary infection takes place by means of conidia.

### **Control**

- Clean and healthy seed should be sown.
- Prior to sowing the seed should be treated with suitable fungicides.
- Hot water treatment may be given to reduce the internal infection.
- The seed should be obtained from disease free areas.
- Blighted plants should be pulled out by hands and burned.
- Seed treatment with **Thiram@ 3 gm** of fungicides per kg of seed helps in reducing seed borne infection.
- Resistant varieties should be shown.

## **Leaf Spot of Green gram**

**Pathogen:** *Cercospora cruenta*.

### **Distribution**

This is wide spread disease, wherever this leguminous crop is grown.

### **Symptoms**

1. The spot develop as brown or red areas with grey centres and purplish borders.
2. Generally the lesion are rounded, but they may be angular because of vein limitations.
3. Sometimes, the shoot holes formed. The severe cases the plants become completely defoliated.

### **Nature and Recurrence**

The disease may survive in the soil along with plant debris. The infection may take place by means of conidia found in the soil in the following season.

### **Control Measures**

- Sanitation and rotation should be practiced.
- Resistant varieties should be sown.

## Tikka Disease of Groundnut

**Pathogen:** *Cercospora personata* (break and curl), ELL & Ever, perfect stage- *Arachidicola berkleyi*.

*Cercospora Arachidicola*, Imperfect stage- *Mycosphaerella*.

### Distribution

This is world wide disease of groundnut, and occurs in all those countries where the crop is grown. The disease occurs in the USA, many African countries, Philippines, Indonesia, India, Australia.

### Symptoms

1. All the parts of the plant found above the ground are affected, but especially the lesion appear on the leaves.
2. In the month of July, when the plants are at least 2 months old, the symptoms beginning to appear and goes on upto maturity of the plants.
3. In this countries, generally the symptoms due to appear. The lesion on the leaves, developed by are *Cercospora personata* rounded and 1-6 mm in diameter. These spots are dark brown or black and found on the both surface of the leaf.
4. Later on, the yellow halo develops around each such leaf spot. The spot surrounded by yellow halos are restricted to the upper surface of the leaf.

### Nature and Recurrence

This is a soil borne disease. The primary infection is caused by means of conidia found on the plant debris in the soil. The spread of disease takes place by means of conidia which are dispersed by wind. The role of the perfect stage of the fungus is not clearly understood.

### Control Measures

- The disease can be controlled to some extent by sanitation and crop rotation.
- The use of **phosphoric and potassic** manure and mixed cropping with arhar also reduce the disease.
- The spraying with **2:2:50 Bordeaux mixture**.
- Resistant varieties should be sown.

# Red Rot of Sugarcane

**Pathogen:** *Colletotricum falcatum*.

## Distribution

The disease is undoubtedly the most serious and destructive in India. It is of common occurrence in all those countries where sugarcane growing States of our country.

## Symptoms

1. The first external symptoms of the disease is that the upper leaves of a shoot, begin to lose colour and drop slightly.
2. There after they wither at the tip and withering progresses down the margin, leaving the centre green. All the parts above the ground are being infected by the fungus.
3. But the symptoms are conspicuously seen on the stem and mid ribs of leaves. The infected stems are completely rotted within the rind loses its naturally bright colour becomes dull in appearance and shrinks at the nodes.
4. The black dot like structure appear on the shrunk internodes. They are the acervuli of the fungus.
5. On splitting open a cane, an alcoholic smell is emitted and the tissue are found to be reddened in one or a few internodes usually towards the base. The reddening is most intense in the vascular bundles but extends to the pith.

## Nature and Recurrence

The disease is seed borne as well as soil borne. It has been observed that the setts harbour the fungus and thus the disease is perpetual from year to year. It has also been observed that the fungus is capable of growing and producing acervuli in soil, but the primary infection is through to be mainly from infected setts.

## Control Measures

- The crop should be thoroughly inspected several times and the infected plants should be destroyed by burning them.
- The water logging condition should be avoided.
- Prior to sowing, the setts should be duly inspected.
- The Practices of sanitation should be adopted. After harvesting the crop, the stubbles and plant debris should be destroyed carefully by burning them.
- The crop rotation of 2 years should be practiced so that the inoculum present in the soil may be destroyed completely.
- The ratooning of infected plants should always be discouraged.
- Only resistant varieties should be grown Co 453, Co 393, Co 356 etc.



# Ring Spot of Sugarcane

**Pathogen:** *Leptosphaeria sahari*.

## Distribution

This is a common disease of sugarcane in several parts of India. The disease was first described in Java and occurs in most sugarcane growing countries as the Philippines, West Indies etc.

## Symptoms

1. The disease symptoms appear soon after the rains have commenced, when the plants are two or three months old.
2. The first symptoms is appearance of small discoloured. generally purple spots seen on both surface of the leaf. As these spots grow and expands at the margin. the central portion becomes dry.
3. The margin consists of narrow, reddish, purple or brownish band, outside which there is sometimes a yellow areola, margining into the green of leaf.
4. The center of the spots is dry and straw coloured and sharply marked off by the surrounding coloured ring. Small dot like structures representing fructification of the parasite are seen in rows on straw coloured spots.

## Predisposing factors

Unfavourable condition of the soil and moisture favour the disease. The disease is seen on the thick canes. Thin cane are never damaged.

## Nature and Recurrence

This is a soil borne disease. The perithecia survive in the soil along with plant debris.

## Control

Sanitation is of some use.

**Mahbubul Alam.**

**CST- 06<sup>th</sup> Batch.**

**Faculty of Agriculture**

**University of Rajshahi.**